

Constraints experienced by agricultural scientists and extension personnel in rice knowledge management and delivery: a case of Rice Knowledge Management Portal (RKMP)

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Abstract

Objectives: To study the constraints experienced by agricultural scientists and extension personnel in utilising and accessing information related to rice from Rice Knowledge Management Portal (RKMP).

Methods/Statistical analysis: The research was conducted in purposively selected districts and simple random sampling technique was used to select the respondents. Ex-post facto research design was used; Different categories of constraints were collected through literature review, expert opinion. Data was collected using semi structured interview schedule. A three point continuum of severity using LIKERT type scale was used for getting responses. Friedman's test was used to finding most important constraint within each group.

Findings: Agricultural scientists and extension personnel faced technological, social, economical and psychological constraints more severely. In case of technological constraints, lack of updated information, technical and infrastructure problems while using ICTs and poor maintenance of ICT tools were major constraints that agricultural scientists and extension personnel have faced. In case of social constraints, restriction to promote organisational information and less networking among extension personnel were found most limiting factors for using portal's information. In case of psychological factors benefits given to particular group of people was found most severe and techno-phobia was found least affecting to respondents for utilising information. In case of economical constraints, high cost of internet and cost of computer/smart phones were limiting the use of information provided by RKMP.

Application/Improvements: The finding will help in restructuring and incorporating necessary modification for reaching the unreached for effective dissemination of information and making portal more effective for users to ensure timely and relevant information.

Keywords: Constraints, technological, social, economical, psychological, Friedman test.

1. Introduction

In the recent era of globalization, knowledge has been recognized as a valuable organizational resource [1] and an important factor for competitive advantage, effective organizational performance and success [2]. The desire to promote better information access to improve the socio-economic condition of the farmers has always been the top priority of agricultural extensionists and rural advisory service providers [3]. Further, ICT can contribute to poverty reduction, if it is tailored to the needs of the poor and if it is used in the right way and for the right purposes [4]. The goal of Information and Communication Technology (ICT) is to provide the benefits of information revolution to the rural masses by enhancing farming efficiency, farm productivity and farmers' income [5]. ICT supports access to timely and relevant information, as well as empower the creation and sharing of knowledge of the farming community itself [6]. ICT is an emerging tool for achieving meaningful societal transformation and it is an emerging tool for achieving meaningful societal transformation [7]. Indian agriculture is a complex enterprise which involves millions of small and marginal farmers. Many of these small and marginal farmers are illiterate and have no access to resources to access modern technology in agriculture [8]. Hence

Knowledge Management (KM) is considered to be very difficult task in Indian agriculture [9] and become one of the foremost agendas in many research institutions and organizations [10]. It constitute of dynamic and continuous set of the process which enables the organization enhancement and expands their innovation processes [11]. In this process, information is collected from various sources and disseminated too many, so that it can be acquired at the right time in the right format by any user [12]. Continuous two-way interaction among the farmers-agricultural scientists and extension personnel is the most critical missing component of agricultural extension [13]. Therefore KM in agriculture has an immense scope and challenge for managing agricultural knowledge in public, private and non-government organizations in India [14]. Various ICT tools have been deployed for agriculture knowledge management which includes organizational web portals created for specific commodities, sectors, and enterprise and for e-commerce activities [15]. A careful analysis of websites and portals indicated that these were mostly used for disseminating generic information and poor in quality [16]. ICT can make Indian AKM more substantive by providing affordable, relevant, searchable and up-to-date agriculture information service to farm communities [17].

In agriculture, technology mediated knowledge management appears to be advantageous factor to make the availability of relevant, contextualized, validated content in usable format and to barter the knowledge between those who can advance it and can use it. Agricultural portal share specially designed single access points to information collected from diverse sources related to crops and its entities. It acts as a gateway to information and an aggregator of knowledge gathered from various sources for various stakeholders such as farmers, extensionists and scientists. Agricultural portal may be private or public; but it depends upon the hosting organization. An effort was made by Indian institute of rice research (IIRR) Hyderabad along with consortium partners to develop such a portal which can cater all the rice related information of all the stakeholders of agriculture. RKMP serves as an information highway for rice sector for farmers, researchers, extension professionals, policy makers, students etc. RKMP provides many queries for rice research and cultivation, as queries related to variety selection, disease management, pest and site specific frequently asked questions [18]. The efforts smoothen the way to reduce the gaps of the growing "Digital information divide" specifically in the important cereal crop of the country namely the rice [19]. Agricultural knowledge management systems are expected to produce accessible content in local languages and at the appropriate technical level that will satisfy most rural community needs and the success of the implementation of new agricultural technology depends on the success of communication between the agricultural experts and the farmers [20]. So an attempt was made to analyze the technological, social, economical and psychological constraints that limit the knowledge management and information delivery.

2. Methodology

The investigation was conducted in NALGONDA OF TELANGANA and west Godavari of Andhra Pradesh districts, the two which was selected purposively. The research areas were purposively selected, because the project, RKMP has been implemented in these districts since its beginning and these districts have largely rice cultivation right through year. From each district fifteen agricultural scientists and fifteen extension personnel were selected through simple random sampling technique for interview. Thus total sixty respondents were selected. In this study, *ex-post facto* research design was used, as the manifestation of the variables has already occurred and having no scope of further manipulation. Different categories of constraints were collected through literature review, expert opinion and agricultural scientists and extension personnel's perception. Data was collected using semi structured interview schedule. A three point continuum of severity was used for getting responses. To find out the most important constraint within each group, a two way analysis of variance using Friedman's test, a non- parametric test, was used. The test statistic is calculated as follows;

$$(x)^2 = \frac{12}{bk(k+1)} \sum_{j=1}^k r_j^2 - 3b(k+1)$$

The law of probability of this test statistic is approximated by the chi-square distribution with k – 1 degrees of freedom.

3. Results and discussions

A constraint is considered to be any factor that limits an individual/group to use any information from the intended result of the information. The limiting factors faced by scientists and extension personnel while utilizing the rice related information was studied. Investigation focussed on analyzing the constraints namely, technological, social, economical and psychological for the study.

3.1. Technological constraints faced by agricultural scientists

Technological constraints were operational as the factors which confined the use of information due to its technological complication and requirement for information and skill on utilising the rice related information. Eight different constraints on technological dimension were enlisted and agricultural scientists responses based on severity using LIKERT type scale were collected. Friedman test was used to compare the constraints. The computed “P” value was less than significant at 1 percent level. Technological constraints were having significant effect on the use of RKMP information and services.

Table 1. Technological constraints perceived by the scientists

S.N.	Statements	Frequency	Mean of ranks	Groups		
1.	Lack of relevant content in the portal	30	3.725	A		
2.	Poor quality of content	30	3.775	A		
3.	Too many steps to get information	30	3.813	A		
4.	Non availability of computer	30	3.838	A	B	
5.	Technical and Infrastructure problems while using ICTs	30	4.281	A	B	
6.	Problems of maintenance/ Poor maintenance of ICT tools	30	5.350		B	C
7.	Lack of updated information	30	6.388			C
	N	30				
	Chi-Square	16.681				
	Df	6				
	Asymp. Sig.	<.005				

Table 1 depicts that among technological constraints lack of updated information (mean ranks=6.388), poor maintenance of ICT tools (5.350) was the major problem faced by agricultural scientists. In other similar study found that lack of time and relevant information in the website was found to be affecting the e- learner [21]. Technical and infrastructural problems while using ICTs (mean ranks=4.281) was also affecting the use of modern technology to access the information. Too many steps to get information (mean ranks=3.813), low quality of content (mean ranks=3.775), and lack of relevant content in the portal (mean ranks=3.725) were found to least affected the use of information from the portal. Similar study on Digital Green portal reported that infrastructural constraint, connectivity breakdown was major constraints in the functioning of [22].

Table 2. Economic constraints perceived by scientists

S.N.	Statements	Frequency	Mean of ranks	Groups
1.	High cost of internet connection	30	1.532	A
2.	Cost of computer/mobile	30	1.471	A
	N	30		
	Chi-Square	.200		
	Df	1		
	Asymp. Sig.	.655		

In case of scientists also, economic constraints like high cost of internet (mean ranks=1.471) and cost of computer/smart phones (mean ranks=1.532) were not found to limit the use of information provided by RKMP (Table 2).

In case of social constraints, restriction to promote organization information in which they are working (mean ranks=3.731) was the major constraint followed by the lack of coordination from senior people (mean ranks=3.631). Apart from these constraints, less networking among scientists (mean ranks=2.813), lack of institutional support (2.763) and lack of acceptability in internet information (mean ranks=2.063) were the other major constraints found (Table 3). As the *p*-value is less than 0.001 it is very clear from social constraints are statistically significantly different from each other.

Table 3. Social constraints perceived by scientists

S.N.	Statements	Frequency	Mean of ranks	Groups		
1.	Lack of acceptability for internet information	30	2.063	A		
2.	Lack of institutional support	30	2.763		B	
3.	Less networking among scientist	30	2.813		B	
4.	Lack of coordination from senior people	30	3.631			C
5.	Restriction to promote organization information in which they work	30	3.731			C
	N	30				
	Chi-Square	19.623				
	Df	4				
	Asymp. Sig.	<.001				

Various psychological constraints were listed and analyzed using Friedman test. In case of psychological constraints, benefits given to particular group of people (mean ranks=2.219) had significant influence on the use of RKMP information, whereas techno phobia (mean ranks=1.988) and lack of motivation (mean ranks=1.794) were the other important constraints (Table 4).

Table 4. Psychological constraints perceived by scientists

S.N.	Statements	Frequency	Mean of ranks	Groups	
1.	Lack of motivation	30	1.794	A	
2.	Techno-phobia	30	1.988	A	B
3.	Benefits given to particular group of people	30	2.219		B
	N	30			
	Chi-Square	.816			
	Df	2			
	Asymp. Sig.	.665			

3.2. Constraints faced by extension personnel

Eight different constraints on technological dimension were enlisted and agricultural scientists responses based on severity using *LIKERT* type scale were collected. Friedman test was used to compare the constraints. The computed “P” value was less than significant at 1 percent level. Technological constraints were having significant effect on the use of RKMP information and services.

Table 5 depicts that among technological constraints, technical and infrastructure problems while using ICTs (mean ranks=5.20),lack of updated information (mean ranks=5.0), poor maintenance of ICT tools (mean ranks=4.98) was the major problem and Non availability of computer (mean ranks=4.45) was also affecting the use of modern technology to access the information. Quality of content is low (mean ranks=3.93), lack of relevant content in the portal (mean ranks=3.68), Too many steps to get information (mean ranks=3.65) were the least significant problems that were limiting the use of information from the portal. This finding was supported by several authors who agree upon these constraints [23]-[26].

Table 5. Technological constraints perceived extension personnel

S.N.	Statements	Frequency	Mean of ranks	Groups		
1.	Too many steps to get information	30	3.65	A		
2.	Lack of relevant content in the portal	30	3.68	A		
3.	Poor quality of content	30	3.93	A	B	
4.	Non availability of computer	30	4.45	A	B	
5.	Problems of maintenance/ Poor maintenance of ICT tools	30	4.98	A	B	C
6.	Lack of updated information	30	5.00		B	C
7.	Technical and Infrastructure problems while using ICTs	30	5.20			C
	N	30				
	Chi-Square	18.482				
	Df	6				
	Asymp. Sig.	<.001				

In case of economic constraints, not much significant problem was found in case of extension personnel as well. High cost of internet (mean ranks=1.43) and cost of computer/smart phones (mean ranks=1.57) were not limiting the use of information provided by RKMP (Table 6). This study was found in harmony that the high cost of buying and maintaining a system adversely affected the deployment of ICTs [27]-[28].

Table 6. Economic constraints perceived by extension personnel

S.N.	Statements	Frequency	Mean of ranks	Groups
1.	High cost of internet connection	30	1.43	A
2.	Cost of computer/mobile	30	1.57	A
	N			30
	Chi-Square			1.000
	Df			1
	Asymp. Sig.			.317

In case of social constraints, restriction to promote organization information in which they were working (mean ranks=3.43) was the major constraint found followed by the less networking among extension personnel (mean ranks=3.33). Apart from these constraints lack of institutional support (mean ranks=3.23), lack of coordination from senior persons (mean ranks=2.65) and lack of acceptability for internet information (mean ranks=2.35) were the other significant constraints for extension personnel (Table 7). The result of the study was found in harmony with other authors also [29].

Table 7. Social constraints perceived by extension personnel

S.N.	Statements	Frequency	Mean of ranks	Groups		
1.	Lack of acceptability for internet information	30	2.35	A		
2.	Lack of coordination from senior persons	30	2.65		B	
3.	Lack of institutional support	30	3.23		B	
4.	Less networking among extension personnel	30	3.33			C
5.	Restriction to promote organization information in which they work	30	3.43			C
	N					30
	Chi-Square					14.092
	Df					4
	Asymp. Sig.					<.005

Table 8. Psychological constraints perceived by extension personnel

S.N.	Statements	Frequency	Mean of ranks	Groups	
1.	Benefits given to particular group of people	30	1.77	A	
2.	Lack of motivation	30	1.90	A	B
3.	Techno-phobia	30	2.33		B
	N		30		
	Chi-Square		2.182		
	Df		2		
	Asymp. Sig.		.336		

4. Strategies for improving use of RKMP

Without suggestions, any research study would be incomplete. Some of the appropriate strategies emerged from focused group discussion with respondents for effective utilization of RKMP information were:

1. Creating awareness among people about the information of RKMP
2. Capacity building for extension personnel for utilizing information provided by RKMP
3. Regularly updated information
4. Providing more location and problem specific relevant information in portal
5. Quick reply by experts to the online queries
6. Develop a Linkage with State Agricultural University (SAUs), Krishi Vigyan Kendra (KVK), ICAR Institutes, and State Department of Agriculture.

5. Conclusion

In the present study it was found that scientists and extension personnel faced the technological constraints such as lack of updated information and poor maintenance of ICT tools and technical and Infrastructure problems while using ICTs were considered to be limiting technological factor for utilizing the information. To prevail over these constraints RKMP needs to be updated information regularly and and regular maintenance of ICT tools is needed. Similarly, scientists and extension personnel faced social constraints like: restriction to promote organization’s information in which they work was the most limiting factor. Similarly, benefits given to particular group of people was also affecting the use of information.

In his study, it was reported that users must have economic resources, including money, skills and technology, and social resources such as motivation, trust, confidence, and knowledge to access, assess, and apply the content of information. To overcome these constraints, a low cost technology in the form of RKMP mobile app can be provided through which all information of rice can be accessed. A link should be with state department to use this information for better sharing and utilizing portal resources effectively. RKMP needs to be promoted all over the country more intensively. The finding will help in restructuring and necessary modifications needed for reaching to unreach for disseminating information and making portal more effective for farmers for timely and relevant information.

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